IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Michael R. Slater, *et al.*
Serial No.: 09/641,319
Filed: 08/18/00
Entitled: **Mutant TNE Polymerases**

Group No.:
Examiner:

CERTIFICATE RE: SEQUENCE LISTING

Commissioner for Patents
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Alexandria, VA 22313-1450

<table>
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<tr><td colspan="2">I hereby certify that this correspondence (along with any referred to as being attached or enclosed) is, on the date shown below, being deposited with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.</td></tr>
<tr><td>Dated: 11/12/2003</td><td>By: *Susan M. McClintock*
Susan M. McClintock</td></tr>
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Sir or Madam:

I hereby state that the enclosed substitute Sequence Listing is being submitted in paper copy and on a computer-readable diskette, and that the content of the paper and computer-readable copies are the same.

Dated: 11/12/03

By: _____
David A. Casimir
Registration No. 42,395

MEDLEN & CARROLL, LLP
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San Francisco, California 94105
608/218-6900

SEQUENCE LISTING

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      Huang, Fen R.
      Hartnett, James R.

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<141> 2000-08-18

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        770   775   780

Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln Leu Met Ala Arg Asp
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Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala Ile Asn Thr Pro Ile
                805   810   815

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aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca     384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct     432
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ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg     480
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ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac     528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac tac tcc tgc gag gat gca gac atc act tat agg ctc     576
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
            180                 185                 190

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc     624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
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            260                 265                 270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca      864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
            275                 280                 285

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His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305                 310                 315                 320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc     1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
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His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
                405                 410                 415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa     1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420                 425                 430

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct     1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
            435                 440                 445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata     1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450                 455                 460

ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat     1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480
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cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag        1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
            485                 490                 495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag        1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500                 505                 510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca        1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
            515                 520                 525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct        1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
            530                 535                 540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga        1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag        1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
            565                 570                 575

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg        1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580                 585                 590

gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc        1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
            595                 600                 605

tgg tct tga                                                            1833
Trp Ser
    610


<210>  8
<211>  610
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  8

Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20                  25                  30


Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
            35                  40                  45


Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
            50                  55                  60
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Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70              75                      80


Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85              90                  95


Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100             105             110


Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
        115             120             125


Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130             135             140


Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145             150             155             160


Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
            165             170             175


Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
        180             185             190


Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
    195             200             205


Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
    210             215             220


Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225             230             235             240


Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
            245             250             255


Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
            260             265             270


Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
    275             280             285


Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
    290             295             300


His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305             310             315             320
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Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
            325   330   335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340   345   350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
            355   360   365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
        370   375   380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385   390   395   400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
                405   410   415

Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
                420   425   430

Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
            435   440   445

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450   455   460

Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465   470   475   480

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485   490   495

Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500   505   510

Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515   520   525

Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530   535   540

Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545   550   555   560

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Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
              565   570   575

Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
              580   585   590

Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
          595   600   605

Trp Ser
    610

<210> 9
<211> 31
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 9
atcgaaaagc tgaccatggt tccatctttt g   31

<210> 10
<211> 1737
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> CDS
<222> (1)..(1734)
<223> Synthetic

<400> 10
atg gtt cca tct ttt gcc ctg gac ctt gaa acg tcc tcc ctt gac ccg   48
Met Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
1   5   10   15

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca   96
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
                20   25   30

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa   144
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
            35   40   45

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg   192
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
    50   55   60

aag att gtg ggt cag aac ctg aag tac gac tac aag gtt ctt atg gta   240
Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
65   70   75   80

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aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca        288
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            85                  90                  95

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct        336
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
            100                 105                 110

ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg        384
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
            115                 120                 125

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac       432
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
            130                 135                 140

aag gct gcg aac tac tcc tgc gag gat gca gac atc act tat agg ctc       480
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
145                 150                 155                 160

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc       528
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
                    165                 170                 175

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa       576
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
            180                 185                 190

ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag       624
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
            195                 200                 205

gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata       672
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
    210                 215                 220

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc       720
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
225                 230                 235                 240

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca       768
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
                    245                 250                 255

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag       816
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
            260                 265                 270

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg       864
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
            275                 280                 285

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc       912
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
            290                 295                 300

gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg       960
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
305                 310                 315                 320
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ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa        1008
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
                325                 330                 335

gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg        1056
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
            340                 345                 350

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct        1104
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
        355                 360                 365

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc        1152
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
    370                 375                 380

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa        1200
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
385                 390                 395                 400

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct        1248
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
                405                 410                 415

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata        1296
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
            420                 425                 430

ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat        1344
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
            435                 440                 445

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag        1392
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
        450                 455                 460

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag        1440
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
465                 470                 475                 480

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca        1488
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
                485                 490                 495

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct        1536
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
                500                 505                 510

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga        1584
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
            515                 520                 525

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag        1632
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
        530                 535                 540

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg        1680
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
545                 550                 555                 560
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gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc      1728
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
                565             570             575

tgg tct tga                                                          1737
Trp Ser
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<210> 11
<211> 578
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 11

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Met Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
1               5               10              15


Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
            20              25              30


Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
        35              40              45


Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
    50              55              60


Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
65              70              75              80


Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
                85              90              95


Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
            100             105             110


Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
        115             120             125


Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
    130             135             140


Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
145             150             155             160


Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
                165             170             175
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Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
            180                 185                 190

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
            195                 200                 205

Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
    210                 215                 220

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
225                 230                 235                 240

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
            245                 250                 255

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
            260                 265                 270

His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
        275                 280                 285

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
    290                 295                 300

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
305                 310                 315                 320

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
            325                 330                 335

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
            340                 345                 350

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
        355                 360                 365

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
    370                 375                 380

Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
385                 390                 395                 400

Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
                405                 410                 415

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
            420                 425                 430
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Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
    435   440   445

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
    450   455   460

Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
465   470   475   480

Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
                485   490   495

Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
            500   505   510

Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
    515   520   525

Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
    530   535   540

Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
545   550   555   560

Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
                565   570   575

Trp Ser

<210> 12
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 12
tgccgtacac ctccgagagc   20

<210> 13
<211> 24
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 13
ctcgtttggc tccagcaaat atgc   24

<210> 14
<211> 21
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 14
tttgccctgg aacttgaaac g   21

<210> 15
<211> 1833
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> CDS
<222> (1)..(1830)

<400> 15
atg aag gaa ctt caa ctg tac gaa gaa gca gaa ccc acc gga tac gaa   48
Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1   5   10   15

atc gtg aag gat cat aag acc ttc gaa gat ctc atc gaa aag ctg aag   96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
                20   25   30

gag gtt cca tct ttt gcc ctg gaa ctt gaa acg tcc tcc ctt gac ccg   144
Glu Val Pro Ser Phe Ala Leu Glu Leu Glu Thr Ser Ser Leu Asp Pro
            35   40   45

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca   192
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
        50   55   60

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa   240
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65   70   75   80

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg   288
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85   90   95

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aag att gtg ggt cag aac ctg aag tac gac tac aag gtt ctt atg gta      336
Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100                 105                 110

aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca      384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct      432
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
        130                 135                 140

ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg      480
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac      528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac tac tcc tgc gag gat gca gac atc act tat agg ctc      576
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
            180                 185                 190

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc      624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
            195                 200                 205

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa      672
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
        210                 215                 220

ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag      720
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                 230                 235                 240

gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata      768
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                245                 250                 255

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc      816
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
            260                 265                 270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca      864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
            275                 280                 285

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag      912
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
        290                 295                 300

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg      960
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305                 310                 315                 320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc     1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325                 330                 335
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gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg          1056
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
        340                     345                 350

ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa          1104
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355                     360                 365

gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg          1152
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370                     375                 380

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct          1200
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385                 390                 395                 400

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc          1248
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
                405                 410                 415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa          1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420                 425                 430

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct          1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435                 440                 445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata          1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450                 455                 460

ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat          1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag          1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485                 490                 495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag          1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500                 505                 510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca          1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
            515                 520                 525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct          1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530                 535                 540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga          1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag          1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575
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-23-

```
gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg     1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580                 585                 590

gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc     1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
            595                 600                 605

                                                                     1833
tgg tct tga
Trp Ser
    610


<210>   16
<211>   610
<212>   PRT
<213>   Artificial Sequence

<220>
<223>   Synthetic

<400>   16

Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20                  25                  30


Glu Val Pro Ser Phe Ala Leu Glu Leu Glu Thr Ser Ser Leu Asp Pro
        35                  40                  45


Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
    50                  55                  60


Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80


Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95


Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100                 105                 110


Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125


Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130                 135                 140


Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160
```

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```
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
              165                   170                   175

Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
              180                   185                   190

Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
         195                   200                   205

Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
    210                   215                   220

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                   230                   235                   240

Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
              245                   250                   255

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
              260                   265                   270

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
         275                   280                   285

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
    290                   295                   300

His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305                   310                   315                   320

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
              325                   330                   335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
         340                   345                   350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
         355                   360                   365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370                   375                   380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385                   390                   395                   400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
              405                   410                   415
```

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```
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
        420                 425                 430


Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435                 440                 445


Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450                 455                 460


Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480


Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
            485                 490                 495


Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
        500                 505                 510


Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515                 520                 525


Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
        530                 535                 540


Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560


Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575


Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
        580                 585                 590


Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595                 600                 605


Trp Ser
610
```

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<210>  17
<211>  17
<212>  DNA
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  17
gaccttgaca cgtcctc                                                          17


<210>  18
<211>  1833
<212>  DNA
<213>  Artificial Sequence

<220>
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<220>
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<222>  (1)..(1830)

<400>  18
atg aag gaa ctt caa ctg tac gaa gaa gca gaa ccc acc gga tac gaa          48
Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15

atc gtg aag gat cat aag acc ttc gaa gat ctc atc gaa aag ctg aag          96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
                20                  25                  30

gag gtt cca tct ttt gcc ctg gac ctt gac acg tcc tcc ctt gac ccg         144
Glu Val Pro Ser Phe Ala Leu Asp Leu Asp Thr Ser Ser Leu Asp Pro
            35                  40                  45

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca         192
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
        50                  55                  60

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa         240
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg         288
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95

aag att gtg ggt cag aac ctg aag tac gac tac aag gtt ctt atg gta         336
Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
                100                 105                 110

aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca         384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct         432
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
        130                 135                 140
```

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```
ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg        480
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac        528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac tac tcc tgc gag gat gca gac atc act tat agg ctc        576
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
                180                 185                 190

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc        624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
            195                 200                 205

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa        672
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
        210                 215                 220

ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag        720
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                 230                 235                 240

gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata        768
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                245                 250                 255

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc        816
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
                260                 265                 270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca        864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
            275                 280                 285

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag        912
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
        290                 295                 300

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg        960
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305                 310                 315                 320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc       1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325                 330                 335

gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg       1056
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340                 345                 350

ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa       1104
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355                 360                 365
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gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg        1152
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370                 375                 380

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct        1200
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385                 390                 395                 400

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc        1248
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
                405                 410                 415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa        1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420                 425                 430

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct        1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435                 440                 445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata        1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450                 455                 460

ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat        1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag        1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485                 490                 495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag        1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
                500                 505                 510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca        1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
            515                 520                 525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct        1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
        530                 535                 540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga        1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag        1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg        1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580                 585                 590
```

```
gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc      1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595                 600                 605

tgg tct tga                                                           1833
Trp Ser
    610


<210>  19
<211>  610
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  19

Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20                  25                  30


Glu Val Pro Ser Phe Ala Leu Asp Leu Asp Thr Ser Ser Leu Asp Pro
        35                  40                  45


Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
    50                  55                  60


Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80


Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95


Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100                 105                 110


Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125


Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130                 135                 140


Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160
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Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165             170             175

Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
            180             185             190

Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
        195             200             205

Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
    210             215             220

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225             230             235             240

Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                245             250             255

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
            260             265             270

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
        275             280             285

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
    290             295             300

His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305             310             315             320

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
            325             330             335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340             345             350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355             360             365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370             375             380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385             390             395             400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
            405             410             415
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Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
        420   425   430

Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435   440   445

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450   455   460

Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465   470   475   480

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485   490   495

Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500   505   510

Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515   520   525

Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530   535   540

Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545   550   555   560

Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565   570   575

Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580   585   590

Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595   600   605

Trp Ser
    610

<210> 20
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 20
taagtgatat ctgcatcctc gcaggagaag ttcgcagcc   39

<210> 21
<211> 39
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 21
acaaggctgc gaacttctcc tgcgaggatg cagatatca   39

<210> 22
<211> 1833
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<220>
<221> CDS
<222> (1)..(1830)

<400> 22
atg aag gaa ctt caa ctg tac gaa gaa gca gaa ccc acc gga tac gaa   48
Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1   5   10   15

atc gtg aag gat cat aag acc ttc gaa gat ctc atc gaa aag ctg aag   96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20   25   30

gag gtt cca tct ttt gcc ctg gac ctt gaa acg tcc tcc ctt gac ccg   144
Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
            35   40   45

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca   192
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
        50   55   60

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa   240
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65   70   75   80

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg   288
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85   90   95

aag att gtg ggt cag aac ctg aag tac gac tac aag gtt ctt atg gta   336
Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100   105   110

aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca   384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115   120   125

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```
tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct          432
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130             135                 140

ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg          480
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145             150                 155                 160

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac         528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac ttc tcc tgc gag gat gca gat atc act tat agg ctc         576
Lys Ala Ala Asn Phe Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
            180                 185                 190

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc         624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
        195                 200                 205

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa         672
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
        210                 215                 220

ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag         720
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225             230                 235                 240

gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata         768
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                245                 250                 255

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc         816
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
            260                 265                 270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca         864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
        275                 280                 285

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag         912
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
        290                 295                 300

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg         960
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305             310                 315                 320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc        1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325                 330                 335

gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg        1056
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340                 345                 350

ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa       1104
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355                 360                 365
```

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gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg      1152
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370                 375                 380

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct      1200
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385                 390                 395                 400

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc      1248
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
                405                 410                 415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa      1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420                 425                 430

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct      1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435                 440                 445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata      1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450                 455                 460

ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat      1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag      1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485                 490                 495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag      1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
                500                 505                 510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca      1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
            515                 520                 525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct      1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530                 535                 540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga      1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag      1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg      1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580                 585                 590
```

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gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc      1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595                     600                 605

tgg tct tga                                                           1833
Trp Ser
    610


<210>  23
<211>  610
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  23

Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5               10              15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20              25              30


Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
        35              40              45


Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
    50              55              60


Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65              70              75              80


Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
            85              90              95


Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100             105             110


Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
        115             120             125


Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130             135             140


Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145             150             155             160


Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165             170             175
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```
Lys Ala Ala Asn Phe Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
          180                 185             190

Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
          195                 200             205

Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
          210                 215             220

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                 230             235                 240

Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
              245             250                 255

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
          260                 265             270

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
          275                 280             285

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
    290                 295             300

His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305                 310             315                 320

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
              325             330                 335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
          340             345                 350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
          355             360                 365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370             375                 380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385             390                 395                 400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
              405             410                 415

Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
          420             425                 430
```

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Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
    435   440   445

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450   455   460

Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465   470   475   480

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
          485   .   490   495

Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
         500   505   510

Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
    515   520   525

Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530   535   540

Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545   550   555   560

Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
         565   570   575

Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
         580   585   590

Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
    595   600   605

Trp Ser
    610

<210> 24
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 24
actcctgcga gaatgctgac atcacttata gg   32

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<210>  25
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<212>  DNA
<213>  Artificial Sequence

<220>
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<222>  (1)..(1830)

<400>  25
atg aag gaa ctt caa ctg tac gaa gaa gca gaa ccc acc gga tac gaa       48
Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                  10                  15

atc gtg aag gat cat aag acc ttc gaa gat ctc atc gaa aag ctg aag       96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
                20                  25                  30

gag gtt cca tct ttt gcc ctg gac ctt gaa acg tcc tcc ctt gac ccg      144
Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
            35                  40                  45

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca      192
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
        50                  55                  60

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa      240
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg      288
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95

aag att gtg ggt cag aac ctg aag tac gac tac aag gtt ctt atg gta      336
Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100                 105                 110

aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca      384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
        115                 120                 125

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct      432
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130                 135                 140

ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg      480
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac      528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac tac tcc tgc gag aat gct gac atc act tat agg ctc      576
Lys Ala Ala Asn Tyr Ser Cys Glu Asn Ala Asp Ile Thr Tyr Arg Leu
            180                 185                 190
```

-39-

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tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc      624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
        195             200                 205

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa      672
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
        210             215                 220

ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag      720
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                 230                 235                 240

gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata      768
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                245                 250                 255

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc      816
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
            260                 265                 270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca      864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
        275                 280                 285

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag      912
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
        290                 295                 300

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg      960
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305                 310                 315                 320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc      1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325                 330                 335

gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg      1056
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340                 345                 350

ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa      1104
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
            355                 360                 365

gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg      1152
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
        370                 375                 380

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct      1200
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385                 390                 395                 400

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc      1248
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
            405                 410                 415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa      1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420                 425                 430
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gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct       1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435                 440                 445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata       1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
        450                 455                 460

ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat       1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag       1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485                 490                 495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag       1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
                500                 505                 510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca       1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515                 520                 525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct       1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
        530                 535                 540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga       1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag       1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg       1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
                580                 585                 590

gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc       1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
                595                 600                 605

tgg tct tga                                                            1833
Trp Ser
        610


<210>  26
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<213>  Artificial Sequence

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Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1   5   10   15

Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20   25   30

Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
        35   40   45

Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
        50   55   60

Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65   70   75   80

Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85   90   95

Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100   105   110

Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115   120   125

Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130   135   140

Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145   150   155   160

Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
            165   170   175

Lys Ala Ala Asn Tyr Ser Cys Glu Asn Ala Asp Ile Thr Tyr Arg Leu
            180   185   190

Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
    195   200   205

Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
    210   215   220

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225   230   235   240

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Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
              245   250   255

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
              260   265   270

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
              275   280   285

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
              290   295   300

His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305   310   315   320

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
              325   330   335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
              340   345   350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
              355   360   365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
      370   375   380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385   390   395   400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
              405   410   415

Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
              420   425   430

Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
      435   440   445

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
      450   455   460

Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465   470   475   480

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
              485   490   495

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Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500                 505             510


Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515                 520             525


Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530                 535             540


Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550             555             560


Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
            565                 570             575


Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
        580                 585             590


Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595                 600             605


Trp Ser
    610


<210>   27
<211>   21
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   Synthetic

<400>   27
tttgccctgg cccttgaaac g                                          21


<210>   28
<211>   1833
<212>   DNA
<213>   Artificial Sequence

<220>
<223>   Synthetic


<220>
<221>   CDS
<222>   (1)..(1830)
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<400>  28
atg aag gaa ctt caa ctg tac gaa gaa gca gaa ccc acc gga tac gaa        48
Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15

atc gtg aag gat cat aag acc ttc gaa gat ctc atc gaa aag ctg aag        96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
                20                  25                  30

gag gtt cca tct ttt gcc ctg gcc ctt gaa acg tcc tcc ctt gac ccg       144
Glu Val Pro Ser Phe Ala Leu Ala Leu Glu Thr Ser Ser Leu Asp Pro
            35                  40   .               45

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca       192
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
        50                  55                  60

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa       240
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg       288
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95

aag att gtg ggt cag aac ctg aag tac gac tac aag gtt ctt atg gta       336
Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
                100                 105                 110

aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca       384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct       432
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
        130                 135                 140

ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg       480
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac      528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac tac tcc tgc gag gat gca gac atc act tat agg ctc       576
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
                180                 185                 190

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc       624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
            195                 200                 205

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa       672
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
        210                 215                 220
```

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ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag        720
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225             .           230             235                 240

gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata        768
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                    245             250             255

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc        816
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
                260             265             270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca        864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
                275             280             285

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag        912
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
        290             295             300

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg        960
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu    .
305             310             315             320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc       1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325             330             335

gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg       1056
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
                340             345             350

ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa       1104
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355             360             365

gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg       1152
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
        370             375             380

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct       1200
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385             390             395             400

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc       1248
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
                405             410             415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa       1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
                420             425             430

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct       1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435             440             445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata       1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450             455             460
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ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat       1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag       1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                    485                 490                 495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag       1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
                500                 505                 510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca       1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
            515                 520                 525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct       1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
        530                 535                 540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga       1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag       1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg       1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580                 585                 590

gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc       1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
            595                 600                 605

tgg tct tga                                                            1833
Trp Ser
    610


<210>  29
<211>  610
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

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Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20                  25                  30


Glu Val Pro Ser Phe Ala Leu Ala Leu Glu Thr Ser Ser Leu Asp Pro
        35                  40                  45
```

```
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
    50                  55              60

Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65              70              75                      80

Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85              90                  95

Lys Ile Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val
            100             105             110

Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
        115             120             125

Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130             135             140

Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145             150             155                     160

Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
            165             170             175

Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
            180             185             190

Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
    195             200             205

Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
    210             215             220

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225             230             235                     240

Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
            245             250             255

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
            260             265             270

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
        275             280             285

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
    290             295             300
```

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His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305   310   315   320

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325   330   335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340   345   350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355   360   365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370   375   380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385   390   395   400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
            405   410   415

Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420   425   430

Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435   440   445

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450   455   460

Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465   470   475   480

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485   490   495

Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500   505   510

Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515   520   525

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Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530                 535                 540

Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575

Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580                 585                 590

Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595                 600                 605

Trp Ser
    610


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Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15

atc gtg aag gat cat aag acc ttc gaa gat ctc atc gaa aag ctg aag      96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
                20                  25                  30

gag gtt cca tct ttt gcc ctg gac ctt gaa acg tcc tcc ctt gac ccg     144
Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
            35                  40                  45

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca     192
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
        50                  55                  60

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa     240
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg     288
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95

aag att gtg ggt cag aac ctg aag tac gcg tac aag gtt ctt atg gta     336
Lys Ile Val Gly Gln Asn Leu Lys Tyr Ala Tyr Lys Val Leu Met Val
            100                 105                 110

aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca     384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct     432
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
        130                 135                 140

ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg     480
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac     528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac tac tcc tgc gag gat gca gac atc act tat agg ctc     576
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
            180                 185                 190

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc     624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
            195                 200                 205

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa     672
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
        210                 215                 220

ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag     720
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                 230                 235                 240
```

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gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata        768
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
            245              250              255

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc        816
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
            260              265              270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca        864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
            275              280              285

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag        912
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
        290              295              300

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg        960
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305              310              315              320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc       1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
            325              330              335

gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg       1056
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340              345              350

ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa       1104
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
            355              360              365

gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg       1152
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
            370              375              380

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct       1200
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385              390              395              400

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc       1248
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
            405              410              415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa       1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420              425              430

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct       1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
            435              440              445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata       1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
        450              455              460
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ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat      1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465             470             475             480

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag      1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485             490             .   495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag      1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
        500             505             510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca      1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515             520             525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct      1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
        530             535     .       540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga      1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545             550             555             560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag      1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565             570             575

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg      1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
                580             585             590

gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc      1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595             600             605

tgg tct tga                                                          1833
Trp Ser
    610


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Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5               10              15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20              25              30


Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
        35              40              45
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Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
    50                  55                  60

Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80

Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95

Lys Ile Val Gly Gln Asn Leu Lys Tyr Ala Tyr Lys Val Leu Met Val
                100                 105                 110

Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
                115                 120                 125

Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130                 135                 140

Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160

Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
                180                 185                 190

Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
    195                 200                 205

Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
    210                 215                 220

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                 230                 235                 240

Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                245                 250                 255

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
                260                 265                 270

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
                275                 280                 285

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
    290                 295                 300
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His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305   310   315   320

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325   330   335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
            340   345   350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355   360   365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370   375   380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385   390   395   400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
            405   410   415

Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420   425   430

Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435   440   445

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450   455   460

Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465   470   475   480

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485   490   495

Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500   505   510

Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
            515   520   525

Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530   535   540

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```
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545             550             555             560


Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
            565             570             575


Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
        580             585             590


Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595             600             605


Trp Ser
    610
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<210> 34
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<212> DNA
<213> Artificial Sequence

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atg aag gaa ctt caa ctg tac gaa gaa gca gaa ccc acc gga tac gaa        48
Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5               10              15

atc gtg aag gat cat aag acc ttc gaa gat ctc atc gaa aag ctg aag        96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20              25              30

gag gtt cca tct ttt gcc ctg gcc ctt gaa acg tcc tcc ctt gac ccg       144
Glu Val Pro Ser Phe Ala Leu Ala Leu Glu Thr Ser Ser Leu Asp Pro
        35              40              45

ttc aac tgt gag ata gtc ggc atc tcc gtg tcg ttc aaa ccg aaa aca       192
Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
    50              55              60

gct tat tac att cca ctt cat cac aga aac gcc cag aat ctt gat gaa       240
Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65              70              75              80

aca ctg gtg ctg tcg aag ttg aaa gag atc ctc gaa gac ccg tct tcg       288
Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
            85              90              95

aag att gtg ggt cag aac ctg aag tac gcg tac aag gtt ctt atg gta       336
Lys Ile Val Gly Gln Asn Leu Lys Tyr Ala Tyr Lys Val Leu Met Val
            100             105             110
```

```
aag ggt ata tcg cca gtt tat ccg cat ttt gac acg atg ata gct gca          384
Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
        115                 120                 125

tat ttg ctg gag cca aac gag aaa aaa ttc aat ctc gaa gat ctg tct          432
Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
        130                 135                 140

ttg aaa ttt ctc gga tac aaa atg acg tct tat cag gaa ctg atg tcg          480
Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160

ttt tcc tca cca ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac          528
Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175

aag gct gcg aac tac tcc tgc gag gat gca gac atc act tat agg ctc          576
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
                180                 185                 190

tac aag ata ctc agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc          624
Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
                195                 200                 205

ttc tac agg ata gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa          672
Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
        210                 215                 220

ttg aac ggg gtg tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag          720
Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225                 230                 235                 240

gag tac ggc aaa aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata          768
Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
                245                 250                 255

gca gga gag ccc ttc aac atc aat tct cca aaa cag gtt tca aag atc          816
Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
                260                 265                 270

ctt ttt gag aag ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca          864
Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
                275                 280                 285

gga gcg tac tct acc agg ata gag gtg ttg gaa gag ata gcg aat gag          912
Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
        290                 295                 300

cac gag ata gta ccc ctc att ctc gag tac aga aag atc cag aaa ctg          960
His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305                 310                 315                 320

aaa tcg acc tac ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc         1008
Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
                325                 330                 335

gga aga att cat gca tct ttc cac cag acg ggt acc gcc act ggc agg         1056
Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
                340                 345                 350
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ttg agt agc agt gat cca aat ctt cag aat ctt ccg aca aag agc gaa    1104
Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355                 360                 365

gag gga aaa gaa att aga aaa gcg att gtg ccc cag gat cca gac tgg    1152
Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
        370                 375                 380

tgg atc gtc agt gcg gat tat tcc caa ata gaa ctc aga atc ctc gct    1200
Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385                 390                 395                 400

cat ctc agt ggt gat gag aac ctt gtg aag gcc ttc gag gag ggc atc    1248
His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
                405                 410                 415

gat gtg cac acc ttg act gcc tcc agg atc tac aac gta aag cca gaa    1296
Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
                420                 425                 430    .

gaa gtg aac gaa gaa atg cga cgg gtt gga aag atg gtg aac ttc tct    1344
Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
                435                 440                 445

ata ata tac ggt gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata    1392
Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
        450                 455                 460

ccg gtt aaa gaa gca gaa aag atg att atc agc tat ttc aca ctg tat    1440
Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465                 470                 475                 480

cca aag gtg cga agc tac atc cag cag gtt gtt gca gag gca aaa gag    1488
Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485                 490                 495

aag ggc tac gtc agg act ctc ttt gga aga aaa aga gat att ccc cag    1536
Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
                500                 505                 510

ctc atg gca agg gac aag aac acc cag tcc gaa ggc gaa aga atc gca    1584
Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515                 520                 525

ata aac acc ccc att cag gga acg gcg gca gat ata ata aaa ttg gct    1632
Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
        530                 535                 540

atg ata gat ata gac gag gag ctg aga aaa aga aac atg aaa tcc aga    1680
Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545                 550                 555                 560

atg atc att cag gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag    1728
Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565                 570                 575

gaa aaa gaa gaa cta gtt gat ctg gtg aag aac aaa atg aca aat gtg    1776
Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
        580                 585                 590
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gtg aaa ctc tct gtg cct ctt gag gtt gac ata agc atc gga aaa agc      1824
Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595                     600                 605

tgg tct tga                                                          1833
Trp Ser
    610


<210>  35
<211>  610
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  35

Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1               5                   10                  15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys
            20                  25                  30


Glu Val Pro Ser Phe Ala Leu Ala Leu Glu Thr Ser Ser Leu Asp Pro
        35                  40                  45


Phe Asn Cys Glu Ile Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr
    50                  55                  60


Ala Tyr Tyr Ile Pro Leu His His Arg Asn Ala Gln Asn Leu Asp Glu
65                  70                  75                  80


Thr Leu Val Leu Ser Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser
                85                  90                  95


Lys Ile Val Gly Gln Asn Leu Lys Tyr Ala Tyr Lys Val Leu Met Val
            100                 105                 110


Lys Gly Ile Ser Pro Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala
            115                 120                 125


Tyr Leu Leu Glu Pro Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser
    130                 135                 140


Leu Lys Phe Leu Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser
145                 150                 155                 160


Phe Ser Ser Pro Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp
                165                 170                 175
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```
Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu
        180             185             190

Tyr Lys Ile Leu Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val
        195             200             205

Phe Tyr Arg Ile Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu
    210             215             220

Leu Asn Gly Val Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu
225             230             235             240

Glu Tyr Gly Lys Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile
            245             250             255

Ala Gly Glu Pro Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile
        260             265             270

Leu Phe Glu Lys Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr
        275             280             285

Gly Ala Tyr Ser Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu
    290             295             300

His Glu Ile Val Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu
305             310             315             320

Lys Ser Thr Tyr Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr
            325             330             335

Gly Arg Ile His Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg
        340             345             350

Leu Ser Ser Ser Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu
        355             360             365

Glu Gly Lys Glu Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp
    370             375             380

Trp Ile Val Ser Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala
385             390             395             400

His Leu Ser Gly Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile
            405             410             415

Asp Val His Thr Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu
            420             425             430
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Glu Val Asn Glu Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser
        435   440   445

Ile Ile Tyr Gly Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile
    450   455   460

Pro Val Lys Glu Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr
465   470   475   480

Pro Lys Val Arg Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu
                485   490   495

Lys Gly Tyr Val Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln
            500   505   510

Leu Met Ala Arg Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala
        515   520   525

Ile Asn Thr Pro Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala
    530   535   540

Met Ile Asp Ile Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg
545   550   555   560

Met Ile Ile Gln Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu
                565   570   575

Glu Lys Glu Glu Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val
            580   585   590

Val Lys Leu Ser Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser
        595   600   605

Trp Ser
    610

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<222> (1)..(1713)

<400> 36

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atg ctt gaa acg tcc tcc ctt gac ccg ttc aac tgt gag ata gtc ggc      48
Met Leu Glu Thr Ser Ser Leu Asp Pro Phe Asn Cys Glu Ile Val Gly
1               5                   10                  15

atc tcc gtg tcg ttc aaa ccg aaa aca gct tat tac att cca ctt cat      96
Ile Ser Val Ser Phe Lys Pro Lys Thr Ala Tyr Tyr Ile Pro Leu His
                20                  25                  30

cac aga aac gcc cag aat ctt gat gaa aca ctg gtg ctg tcg aag ttg      144
His Arg Asn Ala Gln Asn Leu Asp Glu Thr Leu Val Leu Ser Lys Leu
            35                  40                  45

aaa gag atc ctc gaa gac ccg tct tcg aag att gtg ggt cag aac ctg      192
Lys Glu Ile Leu Glu Asp Pro Ser Ser Lys Ile Val Gly Gln Asn Leu
        50                  55                  60

aag tac gac tac aag gtt ctt atg gta aag ggt ata tcg cca gtt tat      240
Lys Tyr Asp Tyr Lys Val Leu Met Val Lys Gly Ile Ser Pro Val Tyr
65                  70                  75                  80

ccg cat ttt gac acg atg ata gct gca tat ttg ctg gag cca aac gag      288
Pro His Phe Asp Thr Met Ile Ala Ala Tyr Leu Leu Glu Pro Asn Glu
                85                  90                  95

aaa aaa ttc aat ctc gaa gat ctg tct ttg aaa ttt ctc gga tac aaa      336
Lys Lys Phe Asn Leu Glu Asp Leu Ser Leu Lys Phe Leu Gly Tyr Lys
                100                 105                 110

atg acg tct tat cag gaa ctg atg tcg ttt tcc tca cca ctt ttt ggt      384
Met Thr Ser Tyr Gln Glu Leu Met Ser Phe Ser Ser Pro Leu Phe Gly
            115                 120                 125

ttc agc ttt gcg gat gtt ccg gta gac aag gct gcg aac tac tcc tgc      432
Phe Ser Phe Ala Asp Val Pro Val Asp Lys Ala Ala Asn Tyr Ser Cys
        130                 135                 140

gag gat gca gac atc act tat agg ctc tac aag ata ctc agc atg aag      480
Glu Asp Ala Asp Ile Thr Tyr Arg Leu Tyr Lys Ile Leu Ser Met Lys
145                 150                 155                 160

ctc cat gaa gcg gaa ctt gag aac gtc ttc tac agg ata gag atg ccg      528
Leu His Glu Ala Glu Leu Glu Asn Val Phe Tyr Arg Ile Glu Met Pro
                165                 170                 175

ctt gtg aac gtt ctt gca cgc atg gaa ttg aac ggg gtg tat gtg gac      576
Leu Val Asn Val Leu Ala Arg Met Glu Leu Asn Gly Val Tyr Val Asp
                180                 185                 190

aca gaa ttc ctg aaa aag ctc tcg gag gag tac ggc aaa aag ctc gag      624
Thr Glu Phe Leu Lys Lys Leu Ser Glu Glu Tyr Gly Lys Lys Leu Glu
            195                 200                 205

gaa ctg gcc gaa aaa atc tac cag ata gca gga gag ccc ttc aac atc      672
Glu Leu Ala Glu Lys Ile Tyr Gln Ile Ala Gly Glu Pro Phe Asn Ile
        210                 215                 220

aat tct cca aaa cag gtt tca aag atc ctt ttt gag aag ctg gga ata      720
Asn Ser Pro Lys Gln Val Ser Lys Ile Leu Phe Glu Lys Leu Gly Ile
225                 230                 235                 240
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aaa ccc cgt gga aaa acg aca aaa aca gga gcg tac tct acc agg ata          768
Lys Pro Arg Gly Lys Thr Thr Lys Thr Gly Ala Tyr Ser Thr Arg Ile
            245             250                 255

gag gtg ttg gaa gag ata gcg aat gag cac gag ata gta ccc ctc att          816
Glu Val Leu Glu Glu Ile Ala Asn Glu His Glu Ile Val Pro Leu Ile
            260             265                 270

ctc gag tac aga aag atc cag aaa ctg aaa tcg acc tac ata gac acc          864
Leu Glu Tyr Arg Lys Ile Gln Lys Leu Lys Ser Thr Tyr Ile Asp Thr
            275             280                 285

ctt ccg aaa ctt gtg aac ccg aaa acc gga aga att cat gca tct ttc          912
Leu Pro Lys Leu Val Asn Pro Lys Thr Gly Arg Ile His Ala Ser Phe
            290             295                 300

cac cag acg ggt acc gcc act ggc agg ttg agt agc agt gat cca aat          960
His Gln Thr Gly Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn
305             310                 315                 320

ctt cag aat ctt ccg aca aag agc gaa gag gga aaa gaa att aga aaa         1008
Leu Gln Asn Leu Pro Thr Lys Ser Glu Glu Gly Lys Glu Ile Arg Lys
                325                 330                 335

gcg att gtg ccc cag gat cca gac tgg tgg atc gtc agt gcg gat tat         1056
Ala Ile Val Pro Gln Asp Pro Asp Trp Trp Ile Val Ser Ala Asp Tyr
                340                 345                 350

tcc caa ata gaa ctc aga atc ctc gct cat ctc agt ggt gat gag aac         1104
Ser Gln Ile Glu Leu Arg Ile Leu Ala His Leu Ser Gly Asp Glu Asn
            355                 360                 365

ctt gtg aag gcc ttc gag gag ggc atc gat gtg cac acc ttg act gcc         1152
Leu Val Lys Ala Phe Glu Glu Gly Ile Asp Val His Thr Leu Thr Ala
            370                 375                 380

tcc agg atc tac aac gta aag cca gaa gaa gtg aac gaa gaa atg cga         1200
Ser Arg Ile Tyr Asn Val Lys Pro Glu Glu Val Asn Glu Glu Met Arg
385             390                 395                 400

cgg gtt gga aag atg gtg aac ttc tct ata ata tac ggt gtc aca ccg         1248
Arg Val Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly Val Thr Pro
                405                 410                 415

tac ggt ctt tct gtg aga ctt gga ata ccg gtt aaa gaa gca gaa aag         1296
Tyr Gly Leu Ser Val Arg Leu Gly Ile Pro Val Lys Glu Ala Glu Lys
                420                 425                 430

atg att atc agc tat ttc aca ctg tat cca aag gtg cga agc tac atc         1344
Met Ile Ile Ser Tyr Phe Thr Leu Tyr Pro Lys Val Arg Ser Tyr Ile
            435                 440                 445

cag cag gtt gtt gca gag gca aaa gag aag ggc tac gtc agg act ctc         1392
Gln Gln Val Val Ala Glu Ala Lys Glu Lys Gly Tyr Val Arg Thr Leu
            450                 455                 460

ttt gga aga aaa aga gat att ccc cag ctc atg gca agg gac aag aac         1440
Phe Gly Arg Lys Arg Asp Ile Pro Gln Leu Met Ala Arg Asp Lys Asn
465                 470                 475                 480
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acc cag tcc gaa ggc gaa aga atc gca ata aac acc ccc att cag gga        1488
Thr Gln Ser Glu Gly Glu Arg Ile Ala Ile Asn Thr Pro Ile Gln Gly
                485             490             495

acg gcg gca gat ata ata aaa ttg gct atg ata gat ata gac gag gag        1536
Thr Ala Ala Asp Ile Ile Lys Leu Ala Met Ile Asp Ile Asp Glu Glu
                500             505             510

ctg aga aaa aga aac atg aaa tcc aga atg atc att cag gtt cat gac        1584
Leu Arg Lys Arg Asn Met Lys Ser Arg Met Ile Ile Gln Val His Asp
        515             520             525

gaa ctg gtc ttc gag gtt ccc gat gag gaa aaa gaa gaa cta gtt gat        1632
Glu Leu Val Phe Glu Val Pro Asp Glu Glu Lys Glu Glu Leu Val Asp
        530             535             540

ctg gtg aag aac aaa atg aca aat gtg gtg aaa ctc tct gtg cct ctt        1680
Leu Val Lys Asn Lys Met Thr Asn Val Val Lys Leu Ser Val Pro Leu
545             550             555             560

gag gtt gac ata agc atc gga aaa agc tgg tct tga                        1716
Glu Val Asp Ile Ser Ile Gly Lys Ser Trp Ser
                565             570


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<220>
<223>   Synthetic

<400>   37

Met Leu Glu Thr Ser Ser Leu Asp Pro Phe Asn Cys Glu Ile Val Gly
1               5               10              15


Ile Ser Val Ser Phe Lys Pro Lys Thr Ala Tyr Tyr Ile Pro Leu His
                20              25              30


His Arg Asn Ala Gln Asn Leu Asp Glu Thr Leu Val Leu Ser Lys Leu
        35              40              45


Lys Glu Ile Leu Glu Asp Pro Ser Ser Lys Ile Val Gly Gln Asn Leu
        50              55              60


Lys Tyr Asp Tyr Lys Val Leu Met Val Lys Gly Ile Ser Pro Val Tyr
65              70              75              80


Pro His Phe Asp Thr Met Ile Ala Ala Tyr Leu Leu Glu Pro Asn Glu
                85              90              95


Lys Lys Phe Asn Leu Glu Asp Leu Ser Leu Lys Phe Leu Gly Tyr Lys
            100             105             110
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Met Thr Ser Tyr Gln Glu Leu Met Ser Phe Ser Ser Pro Leu Phe Gly
        115                 120                 125


Phe Ser Phe Ala Asp Val Pro Val Asp Lys Ala Ala Asn Tyr Ser Cys
    130             135                 140


Glu Asp Ala Asp Ile Thr Tyr Arg Leu Tyr Lys Ile Leu Ser Met Lys
145             150                 155                 160
                                                .

Leu His Glu Ala Glu Leu Glu Asn Val Phe Tyr Arg Ile Glu Met Pro
                165                 170                 175


Leu Val Asn Val Leu Ala Arg Met Glu Leu Asn Gly Val Tyr Val Asp
            180             185                 190


Thr Glu Phe Leu Lys Lys Leu Ser Glu Glu Tyr Gly Lys Lys Leu Glu
        195                 200                 205


Glu Leu Ala Glu Lys Ile Tyr Gln Ile Ala Gly Glu Pro Phe Asn Ile
    210                 215                 220


Asn Ser Pro Lys Gln Val Ser Lys Ile Leu Phe Glu Lys Leu Gly Ile
225                 230                 235                 240


Lys Pro Arg Gly Lys Thr Thr Lys Thr Gly Ala Tyr Ser Thr Arg Ile
            245                 250                 255


Glu Val Leu Glu Glu Ile Ala Asn Glu His Glu Ile Val Pro Leu Ile
            260                 265                 270


Leu Glu Tyr Arg Lys Ile Gln Lys Leu Lys Ser Thr Tyr Ile Asp Thr
        275                 280                 285


Leu Pro Lys Leu Val Asn Pro Lys Thr Gly Arg Ile His Ala Ser Phe
        290                 295                 300


His Gln Thr Gly Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp Pro Asn
305                 310                 315                 320


Leu Gln Asn Leu Pro Thr Lys Ser Glu Glu Gly Lys Glu Ile Arg Lys
            325                 330                 335


Ala Ile Val Pro Gln Asp Pro Asp Trp Trp Ile Val Ser Ala Asp Tyr
            340                 345                 350
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Ser Gln Ile Glu Leu Arg Ile Leu Ala His Leu Ser Gly Asp Glu Asn
        355                 360                 365
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Leu Val Lys Ala Phe Glu Glu Gly Ile Asp Val His Thr Leu Thr Ala
    370   375   380

Ser Arg Ile Tyr Asn Val Lys Pro Glu Glu Val Asn Glu Glu Met Arg
385   390   395   400

Arg Val Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly Val Thr Pro
                405   410   415

Tyr Gly Leu Ser Val Arg Leu Gly Ile Pro Val Lys Glu Ala Glu Lys
            420   425   430

Met Ile Ile Ser Tyr Phe Thr Leu Tyr Pro Lys Val Arg Ser Tyr Ile
        435   440   445

Gln Gln Val Val Ala Glu Ala Lys Glu Lys Gly Tyr Val Arg Thr Leu
    450   455   460

Phe Gly Arg Lys Arg Asp Ile Pro Gln Leu Met Ala Arg Asp Lys Asn
465   470   475   480

Thr Gln Ser Glu Gly Glu Arg Ile Ala Ile Asn Thr Pro Ile Gln Gly
                485   490   495

Thr Ala Ala Asp Ile Ile Lys Leu Ala Met Ile Asp Ile Asp Glu Glu
                500   505   510

Leu Arg Lys Arg Asn Met Lys Ser Arg Met Ile Ile Gln Val His Asp
            515   520   525

Glu Leu Val Phe Glu Val Pro Asp Glu Glu Lys Glu Glu Leu Val Asp
    530   535   540

Leu Val Lys Asn Lys Met Thr Asn Val Val Lys Leu Ser Val Pro Leu
545   550   555   560

Glu Val Asp Ile Ser Ile Gly Lys Ser Trp Ser
                565   570

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<211> 1485
<212> DNA
<213> Artificial Sequence

<220>
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Met Lys Glu Leu Gln Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu
1   5   10   15

atc gtg aag gat cat aag acc ttc gaa gat ctg tct ttg aaa ttt ctc   96
Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ser Leu Lys Phe Leu
                20   25   30

gga tac aaa atg acg tct tat cag gaa ctg atg tcg ttt tcc tca cca   144
Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser Phe Ser Ser Pro
            35   40   45

ctt ttt ggt ttc agc ttt gcg gat gtt ccg gta gac aag gct gcg aac   192
Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp Lys Ala Ala Asn
        50   55   60

tac tcc tgc gag gat gca gac atc act tat agg ctc tac aag ata ctc   240
Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu Tyr Lys Ile Leu
65   70   75   80

agc atg aag ctc cat gaa gcg gaa ctt gag aac gtc ttc tac agg ata   288
Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val Phe Tyr Arg Ile
                85   90   95

gag atg ccg ctt gtg aac gtt ctt gca cgc atg gaa ttg aac ggg gtg   336
Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu Leu Asn Gly Val
            100   105   110

tat gtg gac aca gaa ttc ctg aaa aag ctc tcg gag gag tac ggc aaa   384
Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu Glu Tyr Gly Lys
            115   120   125

aag ctc gag gaa ctg gcc gaa aaa atc tac cag ata gca gga gag ccc   432
Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile Ala Gly Glu Pro
        130   135   140

ttc aac atc aat tct cca aaa cag gtt tca aag atc ctt ttt gag aag   480
Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile Leu Phe Glu Lys
145   150   155   160

ctg gga ata aaa ccc cgt gga aaa acg aca aaa aca gga gcg tac tct   528
Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr Gly Ala Tyr Ser
                165   170   175

acc agg ata gag gtg ttg gaa gag ata gcg aat gag cac gag ata gta   576
Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu His Glu Ile Val
            180   185   190

ccc ctc att ctc gag tac aga aag atc cag aaa ctg aaa tcg acc tac   624
Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu Lys Ser Thr Tyr
            195   200   205

ata gac acc ctt ccg aaa ctt gtg aac ccg aaa acc gga aga att cat   672
Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr Gly Arg Ile His
            210   215   220

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gca tct ttc cac cag acg ggt acc gcc act ggc agg ttg agt agc agt        720
Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg Leu Ser Ser Ser
225             230              235              240

gat cca aat ctt cag aat ctt ccg aca aag agc gaa gag gga aaa gaa        768
Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu Glu Gly Lys Glu
            245              250              255

att aga aaa gcg att gtg ccc cag gat cca gac tgg tgg atc gtc agt        816
Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp Trp Ile Val Ser
            260              265              270

gcg gat tat tcc caa ata gaa ctc aga atc ctc gct cat ctc agt ggt        864
Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala His Leu Ser Gly
            275              280              285

gat gag aac ctt gtg aag gcc ttc gag gag ggc atc gat gtg cac acc        912
Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile Asp Val His Thr
            290              295              300

ttg act gcc tcc agg atc tac aac gta aag cca gaa gaa gtg aac gaa        960
Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu Glu Val Asn Glu
305             310              315              320

gaa atg cga cgg gtt gga aag atg gtg aac ttc tct ata ata tac ggt       1008
Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly
            325              330              335

gtc aca ccg tac ggt ctt tct gtg aga ctt gga ata ccg gtt aaa gaa       1056
Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile Pro Val Lys Glu
            340              345              350

gca gaa aag atg att atc agc tat ttc aca ctg tat cca aag gtg cga       1104
Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr Pro Lys Val Arg
            355              360              365

agc tac atc cag cag gtt gtt gca gag gca aaa gag aag ggc tac gtc       1152
Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu Lys Gly Tyr Val
            370              375              380

agg act ctc ttt gga aga aaa aga gat att ccc cag ctc atg gca agg       1200
Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln Leu Met Ala Arg
385             390              395              400

gac aag aac acc cag tcc gaa ggc gaa aga atc gca ata aac acc ccc       1248
Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala Ile Asn Thr Pro
            405              410              415

att cag gga acg gcg gca gat ata ata aaa ttg gct atg ata gat ata       1296
Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala Met Ile Asp Ile
            420              425              430

gac gag gag ctg aga aaa aga aac atg aaa tcc aga atg atc att cag       1344
Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg Met Ile Ile Gln
            435              440              445

gtt cat gac gaa ctg gtc ttc gag gtt ccc gat gag gaa aaa gaa gaa       1392
Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu Glu Lys Glu Glu
450             455              460
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cta gtt gat ctg gtg aag aac aaa atg aca aat gtg gtg aaa ctc tct        1440
Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val Val Lys Leu Ser
465                 470                 475                 480

gtg cct ctt gag gtt gac ata agc atc gga aaa agc tgg tct tga            1485
Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser Trp Ser
                485                 490
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<210> 39
<211> 494
<212> PRT
<213> Artificial Sequence

<220>
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<400> 39

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1               5                   10                  15


Ile Val Lys Asp His Lys Thr Phe Glu Asp Leu Ser Leu Lys Phe Leu
            20                  25                  30


Gly Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser Phe Ser Ser Pro
        35                  40                  45


Leu Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp Lys Ala Ala Asn
    50                  55                  60


Tyr Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu Tyr Lys Ile Leu
65                  70                  75                  80


Ser Met Lys Leu His Glu Ala Glu Leu Glu Asn Val Phe Tyr Arg Ile
                85                  90                  95


Glu Met Pro Leu Val Asn Val Leu Ala Arg Met Glu Leu Asn Gly Val
            100                 105                 110


Tyr Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu Glu Tyr Gly Lys
        115                 120                 125


Lys Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile Ala Gly Glu Pro
    130                 135                 140


Phe Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile Leu Phe Glu Lys
145                 150                 155                 160


Leu Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr Gly Ala Tyr Ser
                165                 170                 175
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Thr Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu His Glu Ile Val
        180   185   190

Pro Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu Lys Ser Thr Tyr
        195   200   205

Ile Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr Gly Arg Ile His
    210   215   220

Ala Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg Leu Ser Ser Ser
225   230   235   240

Asp Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu Glu Gly Lys Glu
                245   250   255

Ile Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp Trp Ile Val Ser
            260   265   270

Ala Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala His Leu Ser Gly
        275   280   285

Asp Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile Asp Val His Thr
    290   295   300

Leu Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu Glu Val Asn Glu
305   310   315   320

Glu Met Arg Arg Val Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly
                325   330   335

Val Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile Pro Val Lys Glu
            340   345   350

Ala Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr Pro Lys Val Arg
        355   360   365

Ser Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu Lys Gly Tyr Val
    370   375   380

Arg Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln Leu Met Ala Arg
385   390   395   400

Asp Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala Ile Asn Thr Pro
                405   410   415

Ile Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala Met Ile Asp Ile
        420   425   430

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Asp Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg Met Ile Ile Gln
        435   440   445

Val His Asp Glu Leu Val Phe Glu Val Pro Asp Glu Glu Lys Glu Glu
    450   455   460

Leu Val Asp Leu Val Lys Asn Lys Met Thr Asn Val Val Lys Leu Ser
465   470   475   480

Val Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser Trp Ser
                485   490

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<212>   DNA
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<220>
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<400>   40
cgccagggtt ttcccagtca cgac   24

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<212>   DNA
<213>   Artificial Sequence

<220>
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<400>   41
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agtgagtcgt atta   74

<210>   42
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<212>   DNA
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<220>
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<400>   42
taatacgact cactataggg cgaat   25

<210>   43
<211>   25
<212>   DNA
<213>   Artificial Sequence

<220>
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<400> 43
gaatcgtcgt atgcagtgaa aactc   25

<210> 44
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<212> DNA
<213> Artificial Sequence

<220>
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<400> 44
cttgattgac aaggatggat ggcta   25

<210> 45
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<400> 45
catggtttaa atcctgtgtg aaattgttat ccg   33

<210> 46
<211> 29
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 46
cggataacaa tttcacacag gatttaaac   29

<210> 47
<211> 25
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 47
taatacgact cactataggg cgaat   25

<210> 48
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<212> DNA
<213> Artificial Sequence

<220>
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<400> 48
catgccatgg catgcattta cgttgacacc a   31

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<210> 49
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 49
tcccccgggt tgcgctcact gcccgctttc cagt   34

<210> 50
<211> 34
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 50
agcttatcga tggcactttt cggggaaatg tgcg   34

<210> 51
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 51
agcttatcga taagcgatgc cgggagcaga caagc   35

<210> 52
<211> 17
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 52

Glu Thr Tyr Val Val Phe Asp Val Glu Thr Thr Gly Leu Ser Ala Val
1   5   10   15

Tyr

```
<210>  53
<211>  17
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  53

Thr Arg Gln Ile Val Leu Asp Thr Glu Thr Thr Gly Met Asn Gln Ile
1               5                   10                  15


Gly



<210>  54
<211>  18
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  54

Arg Val Ile Tyr Met Pro Phe Asp Asn Glu Arg Asp Met Leu Met Glu
1               5                   10                  15


Tyr Ile



<210>  55
<211>  15
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  55

Met Ile Val Ser Asp Ile Glu Ala Asn Ala Leu Leu Glu Ser Val
1               5                   10                  15


<210>  56
<211>  18
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic
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<400> 56

Lys Ala Pro Val Phe Ala Phe Asp Thr Glu Thr Asp Ser Leu Asp Asn
1   5   10   15

Ile Ser

<210> 57
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 57

Glu Ser Pro Ser Phe Ala Ile Asp Leu Glu Thr Ser Ser Leu Asp Pro
1   5   10   15

Phe Asp

<210> 58
<211> 18
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 58

Glu Val Pro Ser Phe Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro
1   5   10   15

Phe Asn

<210> 59
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 59

Leu Val Ala His Asn Ala Ser Phe Asp Met Gly Phe Leu Asn
1   5   10

```
<210>  60
<211>  14
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  60

Leu Val Ile His Asn Ala Ala Phe Asp Ile Gly Phe Met Asp
1               5                   10


<210>  61
<211>  15
<212>  PRT
<213>  Artificial Sequence

<220>
<223>  Synthetic

<400>  61

Phe Thr Gly Trp Asn Ile Glu Gly Phe Asp Val Pro Tyr Ile Met
1               5                   10                  15
                                                         .


<210>  62
<211>  14
<212>  PRT
<213>  Artificial Sequence          .

<220>
<223>  Synthetic

<400>  62

Val Phe His Asn Gly His Lys Tyr Asp Val Pro Ala Leu Thr
1               5                   10
                                                         .


<210>  63
<211>  13
<212>  PRT
<213>  Artificial Sequence          .

<220>
<223>  Synthetic

<400>  63

Val Gly Gln Asn Leu Lys Tyr Asp Arg Gly Ile Leu Ala
1               5                   10
```

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```
<210>    64
<211>    13
<212>    PRT
<213>    Artificial Sequence

<220>
<223>    Synthetic

<400>    64

Val Gly Gln Asn Leu Lys Phe Asp Tyr Lys Val Leu Met
1                   5                   10


<210>    65
<211>    13
<212>    PRT
<213>    Artificial Sequence

<220>
<223>    Synthetic

<400>    65

Val Gly Gln Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met
1                   5                   10


<210>    66
<211>    13
<212>    PRT
<213>    Artificial Sequence

<220>
<223>    Synthetic

<400>    66

Thr Leu Cys Lys Lys Phe Asp Ile Glu Leu Thr Gln His
1                   5                   10


<210>    67
<211>    13
<212>    PRT
<213>    Artificial Sequence

<220>
<223>    Synthetic

<400>    67

Ala Leu Cys Ala Arg Tyr Glu Ile Asp Asn Ser Lys Arg
1                   5                   10
```

<210> 68
<211> 12
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 68

Asp Lys Ile Arg Gly Phe Ile Asp Leu Val Leu Ser
1   5   10

<210> 69
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 69

Glu Glu Met Met Asp Tyr Asn Val Gln Asp Val Val Val Thr
1   5   10

<210> 70
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 70

Glu Glu Ala Gly Arg Tyr Ala Ala Glu Asp Ala Asp Val Thr
1   5   10

<210> 71
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 71

Glu Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr
1   5   10

```
<210> 72
<211> 14
<212> PRT
<213> Artificial Sequence

<220>
<223> Synthetic

<400> 72

Asp Lys Ala Ala Asn Tyr Ser Cys Glu Asp Ala Asp Ile Thr
1               5                   10


<210> 73
<211> 928
<212> PRT
<213> Escherichia coli

<400> 73

Met Val Gln Ile Pro Gln Asn Pro Leu Ile Leu Val Asp Gly Ser Ser
1               5                   10                  15


Tyr Leu Tyr Arg Ala Tyr His Ala Phe Pro Pro Leu Thr Asn Ser Ala
                20                  25                  30


Gly Glu Pro Thr Gly Ala Met Tyr Gly Val Leu Asn Met Leu Arg Ser
            35                  40                  45


Leu Ile Met Gln Tyr Lys Pro Thr His Ala Ala Val Val Phe Asp Ala
        50                  55                  60


Lys Gly Lys Thr Phe Arg Asp Glu Leu Phe Glu His Tyr Lys Ser His
65                  70                  75                  80


Arg Pro Pro Met Pro Asp Asp Leu Arg Ala Gln Ile Glu Pro Leu His
                85                  90                  95


Ala Met Val Lys Ala Met Gly Leu Pro Leu Leu Ala Val Ser Gly Val
                100                 105                 110


Glu Ala Asp Asp Val Ile Gly Thr Leu Ala Arg Glu Ala Glu Lys Ala
            115                 120                 125


Gly Arg Pro Val Leu Ile Ser Thr Gly Asp Lys Asp Met Ala Gln Leu
        130                 135                 140


Val Thr Pro Asn Ile Thr Leu Ile Asn Thr Met Thr Asn Thr Ile Leu
145                 150                 155                 160
```

Gly Pro Glu Glu Val Val Asn Lys Tyr Gly Val Pro Pro Glu Leu Ile
             165   170   175

Ile Asp Phe Leu Ala Leu Met Gly Asp Ser Ser Asp Asn Ile Pro Gly
         180   185   190

Val Pro Gly Val Gly Glu Lys Thr Ala Gln Ala Leu Leu Gln Gly Leu
       195   200   205

Gly Gly Leu Asp Thr Leu Tyr Ala Glu Pro Glu Lys Ile Ala Gly Leu
       210   215   220

Ser Phe Arg Gly Ala Lys Thr Met Ala Ala Lys Leu Glu Gln Asn Lys
225   230   235   240

Glu Val Ala Tyr Leu Ser Tyr Gln Leu Ala Thr Ile Lys Thr Asp Val
         245   250   255

Glu Leu Glu Leu Thr Cys Glu Gln Leu Glu Val Gln Gln Pro Ala Ala
         260   265   270

Glu Glu Leu Leu Gly Leu Phe Lys Lys Tyr Glu Phe Lys Arg Trp Thr
         275   280   285

Ala Asp Val Glu Ala Gly Lys Trp Leu Gln Ala Lys Gly Ala Lys Pro
     290   295   300

Ala Ala Lys Pro Gln Glu Thr Ser Val Ala Asp Glu Ala Pro Glu Val
305   310   315   320

Thr Ala Thr Val Ile Ser Tyr Asp Asn Tyr Val Thr Ile Leu Asp Glu
         325   330   335

Glu Thr Leu Lys Ala Trp Ile Ala Lys Leu Glu Lys Ala Pro Val Phe
         340   345   350

Ala Phe Asp Thr Glu Thr Asp Ser Leu Asp Asn Ile Ser Ala Asn Leu
         355   360   365

Val Gly Leu Ser Phe Ala Ile Glu Pro Gly Val Ala Ala Tyr Ile Pro
     370   375   380

Val Ala His Asp Tyr Leu Asp Ala Pro Asp Gln Ile Ser Arg Glu Arg
385   390   395   400

Ala Leu Glu Leu Leu Lys Pro Leu Leu Glu Asp Glu Lys Ala Leu Lys
         405   410   415

Val Gly Gln Asn Leu Lys Tyr Asp Arg Gly Ile Leu Ala Asn Tyr Gly
          420   425   430

Ile Glu Leu Arg Gly Ile Ala Phe Asp Thr Met Leu Glu Ser Tyr Ile
          435   440   445

Leu Asn Ser Val Ala Gly Arg His Asp Met Asp Ser Leu Ala Glu Arg
    450   455   460

Trp Leu Lys His Lys Thr Ile Thr Phe Glu Glu Ile Ala Gly Lys Gly
465   470   475   480

Lys Asn Gln Leu Thr Phe Asn Gln Ile Ala Leu Glu Glu Ala Gly Arg
              485   490   495

Tyr Ala Ala Glu Asp Ala Asp Val Thr Leu Gln Leu His Leu Lys Met
          500   505   510

Trp Pro Asp Leu Gln Lys His Lys Gly Pro Leu Asn Val Phe Glu Asn
          515   520   525

Ile Glu Met Pro Leu Val Pro Val Leu Ser Arg Ile Glu Arg Asn Gly
    530   535   540

Val Lys Ile Asp Pro Lys Val Leu His Asn His Ser Glu Glu Leu Thr
545   550   555   560

Leu Arg Leu Ala Glu Leu Glu Lys Lys Ala His Glu Ile Ala Gly Glu
              565   570   575

Glu Phe Asn Leu Ser Ser Thr Lys Gln Leu Gln Thr Ile Leu Phe Glu
          580   585   590

Lys Gln Gly Ile Lys Pro Leu Lys Lys Thr Pro Gly Gly Ala Pro Ser
          595   600   605

Thr Ser Glu Glu Val Leu Glu Glu Leu Ala Leu Asp Tyr Pro Leu Pro
    610   615   620

Lys Val Ile Leu Glu Tyr Arg Gly Leu Ala Lys Leu Lys Ser Thr Tyr
625   630   635   . 640

Thr Asp Lys Leu Pro Leu Met Ile Asn Pro Lys Thr Gly Arg Val His
                645   650   655

Thr Ser Tyr His Gln Ala Val Thr Ala Thr Gly Arg Leu Ser Ser Thr
            660   665   670   .

Asp Pro Asn Leu Gln Asn Ile Pro Val Arg Asn Glu Glu Gly Arg Arg
        675   680   685

Ile Arg Gln Ala Phe Ile Ala Pro Glu Asp Tyr Val Ile Val Ser Ala
    690   .   695   700   .

Asp Tyr Ser Gln Ile Glu Leu Arg Ile Met Ala His Leu Ser Arg Asp
705   710   715   720

Lys Gly Leu Leu Thr Ala Phe Ala Glu Gly Lys Asp Ile His Arg Ala
            725   730   735

Thr Ala Ala Glu Val Phe Gly Leu Pro Leu Glu Thr Val Thr Ser Glu
            740   745   750

Gln Arg Arg Ser Ala Lys Ala Ile Asn Phe Gly Leu Ile Tyr Gly Met
        755   760   765

Ser Ala Phe Gly Leu Ala Arg Gln Leu Asn Ile Pro Arg Lys Glu Ala
    770   775   780

Gln Lys Tyr Met Asp Leu Tyr Phe Glu Arg Tyr Pro Gly Val Leu Glu
785   790   795   800
  .

Tyr Met Glu Arg Thr Arg Ala Gln Ala Lys Glu Gln Gly Tyr Val Glu
            805   810   815

Thr Leu Asp Gly Arg Arg Leu Tyr Leu Pro Asp Ile Lys Ser Ser Asn
            820   825   830

Gly Ala Arg Arg Ala Ala Ala Glu Arg Ala Ala Ile Asn Ala Pro Met
        835   840   .   845

Gln Gly Thr Ala Ala Asp Ile Ile Lys Arg Ala Met Ile Ala Val Asp
    850   855   860

Ala Trp Leu Gln Ala Glu Gln Pro Arg Val Arg Met Ile Met Gln Val
865   870   875   880

His Asp Glu Leu Val Phe Glu Val His Lys Asp Asp Val Asp Ala Val
            885   890   895

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Ala Lys Gln Ile His Gln Leu Met Glu Asn Cys Thr Arg Leu Asp Val
        900   905   910

Pro Leu Leu Val Glu Val Gly Ser Gly Glu Asn Trp Asp Gln Ala His
        915   920   925

<210>   74
<211>   893
<212>   PRT
<213>   Thermotoga maritima

<400>   74

Met Ala Arg Leu Phe Leu Phe Asp Gly Thr Ala Leu Ala Tyr Arg Ala
1   5   10   15

Tyr Tyr Ala Leu Asp Arg Ser Leu Ser Thr Ser Thr Gly Ile Pro Thr
        20   25   30

Asn Ala Thr Tyr Gly Val Ala Arg Met Leu Val Arg Phe Ile Lys Asp
        35   40   45

His Ile Ile Val Gly Lys Asp Tyr Val Ala Val Ala Phe Asp Lys Lys
    50   55   60

Ala Ala Thr Phe Arg His Lys Leu Leu Glu Thr Tyr Lys Ala Gln Arg
65   70   75   80

Pro Lys Thr Pro Asp Leu Leu Ile Gln Gln Leu Pro Tyr Ile Lys Lys
            85   90   95

Leu Val Glu Ala Leu Gly Met Lys Val Leu Glu Val Glu Gly Tyr Glu
            100   105   110

Ala Asp Asp Ile Ile Ala Thr Leu Ala Val Lys Gly Leu Pro Leu Phe
        115   120   125

Asp Glu Ile Phe Ile Val Thr Gly Asp Lys Asp Met Leu Gln Leu Val
    130   135   140

Asn Glu Lys Ile Lys Val Trp Arg Ile Val Lys Gly Ile Ser Asp Leu
145   150   155   160

Glu Leu Tyr Asp Ala Gln Lys Val Lys Glu Lys Tyr Gly Val Glu Pro
            165   170   175

Gln Gln Ile Pro Asp Leu Leu Ala Leu Thr Gly Asp Glu Ile Asp Asn
        180   185   190

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Ile Pro Gly Val Thr Gly Ile Gly Glu Lys Thr Ala Val Gln Leu Leu
        195   200   205

Glu Lys Tyr Lys Asp Leu Glu Asp Ile Leu Asn His Val Arg Glu Leu
        210   215   220

Pro Gln Lys Val Arg Lys Ala Leu Leu Arg Asp Arg Glu Asn Ala Ile
225   230   235   240

Leu Ser Lys Lys Leu Ala Ile Leu Glu Thr Asn Val Pro Ile Glu Ile
                245   250   255

Asn Trp Glu Glu Leu Arg Tyr Gln Gly Tyr Asp Arg Glu Lys Leu Leu
            260   265   270

Pro Leu Leu Lys Glu Leu Glu Phe Ala Ser Ile Met Lys Glu Leu Gln
        275   280   285

Leu Tyr Glu Glu Ser Glu Pro Val Gly Tyr Arg Ile Val Lys Asp Leu
        290   295   300

Val Glu Phe Glu Lys Leu Ile Glu Lys Leu Arg Glu Ser Pro Ser Phe
305   310   315   320

Ala Ile Asp Leu Glu Thr Ser Ser Leu Asp Pro Phe Asp Cys Asp Ile
            325   330   335

Val Gly Ile Ser Val Ser Phe Lys Pro Lys Glu Ala Tyr Tyr Ile Pro
            340   345   350

Leu His His Arg Asn Ala Gln Asn Leu Asp Glu Lys Glu Val Leu Lys
        355   360   365

Lys Leu Lys Glu Ile Leu Glu Asp Pro Gly Ala Lys Ile Val Gly Gln
        370   375   380

Asn Leu Lys Phe Asp Tyr Lys Val Leu Met Val Lys Gly Val Glu Pro
385   390   395   400

Val Pro Pro Tyr Phe Asp Thr Met Ile Ala Ala Tyr Leu Leu Glu Pro
            405   410   415

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```
Asn Glu Lys Lys Phe Asn Leu Asp Asp Leu Ala Leu Lys Phe Leu Gly
            420                 425                 430

Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser Phe Ser Phe Pro Leu
        435                 440                 445

Phe Gly Phe Ser Phe Ala Asp Val Pro Val Glu Lys Ala Ala Asn Tyr
    450                 455                 460

Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu Tyr Lys Thr Leu Ser
465                 470                 475                 480

Leu Lys Leu His Glu Ala Asp Leu Glu Asn Val Phe Tyr Lys Ile Glu
                485                 490                 495

Met Pro Leu Val Asn Val Leu Ala Arg Met Glu Leu Asn Gly Val Tyr
            500                 505                 510

Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu Glu Tyr Gly Lys Lys
        515                 520                 525

Leu Glu Glu Leu Ala Glu Glu Ile Tyr Arg Ile Ala Gly Glu Pro Phe
    530                 535                 540

Asn Ile Asn Ser Pro Lys Gln Val Ser Arg Ile Leu Phe Glu Lys Leu
545                 550                 555                 560

Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr Gly Asp Tyr Ser Thr
                565                 570                 575

Arg Ile Glu Val Leu Glu Glu Leu Ala Gly Glu His Glu Ile Ile Pro
            580                 585                 590

Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu Lys Ser Thr Tyr Ile
        595                 600                 605

Asp Ala Leu Pro Lys Met Val Asn Pro Lys Thr Gly Arg Ile His Ala
    610                 615                 620

Ser Phe Asn Gln Thr Gly Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp
625                 630                 635                 640

Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu Glu Gly Lys Glu Ile
                645                 650                 655

Arg Lys Ala Ile Val Pro Gln Asp Pro Asn Trp Trp Ile Val Ser Ala
            660                 665                 670
```

```
Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala His Leu Ser Gly Asp
        675             680             685

Glu Asn Leu Leu Arg Ala Phe Glu Glu Gly Ile Asp Val His Thr Leu
        690             695             700

Thr Ala Ser Arg Ile Phe Asn Val Lys Pro Glu Glu Val Thr Glu Glu
705             710             715             720

Met Arg Arg Ala Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly Val
                725             730             735

Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Val Pro Val Lys Glu Ala
            740             745             750

Glu Lys Met Ile Val Asn Tyr Phe Val Leu Tyr Pro Lys Val Arg Asp
        755             760             765

Tyr Ile Gln Arg Val Val Ser Glu Ala Lys Glu Lys Gly Tyr Val Arg
    770             775             780

Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln Leu Met Ala Arg Asp
785             790             795             800

Arg Asn Thr Gln Ala Glu Gly Glu Arg Ile Ala Ile Asn Thr Pro Ile
                805             810             815

Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala Met Ile Glu Ile Asp
            820             825             830

Arg Glu Leu Lys Glu Arg Lys Met Arg Ser Lys Met Ile Ile Gln Val
        835             840             845

His Asp Glu Leu Val Phe Glu Val Pro Asn Glu Glu Lys Asp Ala Leu
    850             855             860

Val Glu Leu Val Lys Asp Arg Met Thr Asn Val Val Lys Leu Ser Val
865             870             875             880

Pro Leu Glu Val Asp Val Thr Ile Gly Lys Thr Trp Ser
                885             890
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<210> 75
<211> 893
<212> PRT
<213> Thermotoga neapolitana

<400> 75

Met Ala Arg Leu Phe Leu Phe Asp Gly Thr Ala Leu Ala Tyr Arg Ala
1   5   10   15

Tyr Tyr Ala Leu Asp Arg Ser Leu Ser Thr Ser Thr Gly Ile Pro Thr
            20   25   30

Asn Ala Val Tyr Gly Val Ala Arg Met Leu Val Lys Phe Ile Lys Glu
            35   40   45

His Ile Ile Pro Glu Lys Asp Tyr Ala Ala Val Ala Phe Asp Lys Lys
    50   55   60

Ala Ala Thr Phe Arg His Lys Leu Leu Glu Ala Tyr Lys Ala Gln Arg
65   70   75   80

Pro Lys Thr Pro Asp Leu Leu Val Gln Gln Leu Pro Tyr Ile Lys Arg
                85   90   95

Leu Ile Glu Ala Leu Gly Phe Lys Val Leu Glu Leu Glu Gly Tyr Glu
            100   105   110

Ala Asp Asp Ile Ile Ala Thr Leu Ala Val Lys Gly Cys Thr Phe Phe
            115   120   125

Asp Glu Ile Phe Ile Ile Thr Gly Asp Lys Asp Met Leu Gln Leu Val
    130   135   140

Asn Glu Lys Ile Lys Val Trp Arg Ile Val Lys Gly Ile Ser Asp Leu
145   150   155   160

Glu Leu Tyr Asp Ser Lys Lys Val Lys Glu Arg Tyr Gly Val Glu Pro
                165   170   175

His Gln Ile Pro Asp Leu Leu Ala Leu Thr Gly Asp Glu Ile Asp Asn
            180   185   190

Ile Pro Gly Val Thr Gly Ile Gly Glu Lys Thr Ala Val Gln Leu Leu
            195   200   205

Gly Lys Tyr Arg Asn Leu Glu Asp Ile Leu Glu His Ala Arg Glu Leu
    210   215   220

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Pro Gln Arg Val Arg Lys Ala Leu Leu Arg Asp Arg Glu Val Ala Ile
225   230   235   240

Leu Ser Lys Lys Leu Ala Thr Leu Val Thr Asn Ala Pro Val Glu Val
                245   250   255

Asp Trp Glu Glu Met Lys Tyr Arg Gly Tyr Asp Lys Arg Lys Leu Leu
            260   265   270

Pro Ile Leu Lys Glu Leu Glu Phe Ala Ser Ile Met Lys Glu Leu Gln
            275   280   285

Leu Tyr Glu Glu Ala Glu Pro Thr Gly Tyr Glu Ile Val Lys Asp His
        290   295   300

Lys Thr Phe Glu Asp Leu Ile Glu Lys Leu Lys Glu Val Pro Ser Phe
305   310   315   320

Ala Leu Asp Leu Glu Thr Ser Ser Leu Asp Pro Phe Asn Cys Glu Ile
                325   330   335

Val Gly Ile Ser Val Ser Phe Lys Pro Lys Thr Ala Tyr Tyr Ile Pro
                340   345   350

Leu His His Arg Asn Ala Gln Asn Leu Asp Glu Thr Leu Val Leu Ser
            355   360   365

Lys Leu Lys Glu Ile Leu Glu Asp Pro Ser Ser Lys Ile Val Gly Gln
        370   375   380

Asn Leu Lys Tyr Asp Tyr Lys Val Leu Met Val Lys Gly Ile Ser Pro
385   390   395   400

Val Tyr Pro His Phe Asp Thr Met Ile Ala Ala Tyr Leu Leu Glu Pro
                405   410   415

Asn Glu Lys Lys Phe Asn Leu Glu Asp Leu Ser Leu Lys Phe Leu Gly
            420   425   430

Tyr Lys Met Thr Ser Tyr Gln Glu Leu Met Ser Phe Ser Ser Pro Leu
        435   440   445

Phe Gly Phe Ser Phe Ala Asp Val Pro Val Asp Lys Ala Ala Asn Tyr
        450   455   460

Ser Cys Glu Asp Ala Asp Ile Thr Tyr Arg Leu Tyr Lys Ile Leu Ser
465   470   475   480

Met Lys Leu His Glu Ala Glu Leu Glu Asn Val Phe Tyr Arg Ile Glu
            485   490   495   .

Met Pro Leu Val Asn Val Leu Ala Arg Met Glu Leu Asn Gly Val Tyr
            500   505   510

Val Asp Thr Glu Phe Leu Lys Lys Leu Ser Glu Glu Tyr Gly Lys Lys
            515   520   525

Leu Glu Glu Leu Ala Glu Lys Ile Tyr Gln Ile Ala Gly Glu Pro Phe
        530   535   540

Asn Ile Asn Ser Pro Lys Gln Val Ser Lys Ile Leu Phe Glu Lys Leu
545   550   555   560

Gly Ile Lys Pro Arg Gly Lys Thr Thr Lys Thr Gly Ala Tyr Ser Thr
                565   570   575

Arg Ile Glu Val Leu Glu Glu Ile Ala Asn Glu His Glu Ile Val Pro
            580   585   590

Leu Ile Leu Glu Tyr Arg Lys Ile Gln Lys Leu Lys Ser Thr Tyr Ile
        595   600   605

Asp Thr Leu Pro Lys Leu Val Asn Pro Lys Thr Gly Arg Ile His Ala
    610   615   620

Ser Phe His Gln Thr Gly Thr Ala Thr Gly Arg Leu Ser Ser Ser Asp
625   630   635   640

Pro Asn Leu Gln Asn Leu Pro Thr Lys Ser Glu Glu Gly Lys Glu Ile
                645   650   655

Arg Lys Ala Ile Val Pro Gln Asp Pro Asp Trp Trp Ile Val Ser Ala
            660   665   670

Asp Tyr Ser Gln Ile Glu Leu Arg Ile Leu Ala His Leu Ser Gly Asp
        675   680   685

Glu Asn Leu Val Lys Ala Phe Glu Glu Gly Ile Asp Val His Thr Leu
    690   695   700

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Thr Ala Ser Arg Ile Tyr Asn Val Lys Pro Glu Glu Val Asn Glu Glu
705   710   715   720

Met Arg Arg Val Gly Lys Met Val Asn Phe Ser Ile Ile Tyr Gly Val
                725   730   735

Thr Pro Tyr Gly Leu Ser Val Arg Leu Gly Ile Pro Val Lys Glu Ala
            740   745   750

Glu Lys Met Ile Ile Ser Tyr Phe Thr Leu Tyr Pro Lys Val Arg Ser
        755   760   765

Tyr Ile Gln Gln Val Val Ala Glu Ala Lys Glu Lys Gly Tyr Val Arg
    770   775   780

Thr Leu Phe Gly Arg Lys Arg Asp Ile Pro Gln Leu Met Ala Arg Asp
785   790   795   800

Lys Asn Thr Gln Ser Glu Gly Glu Arg Ile Ala Ile Asn Thr Pro Ile
            805   810   815

Gln Gly Thr Ala Ala Asp Ile Ile Lys Leu Ala Met Ile Asp Ile Asp
            820   825   830

Glu Glu Leu Arg Lys Arg Asn Met Lys Ser Arg Met Ile Ile Gln Val
        835   840   845

His Asp Glu Leu Val Phe Glu Val Pro Asp Glu Glu Lys Glu Glu Leu
    850   855   860

Val Asp Leu Val Lys Asn Lys Met Thr Asn Val Val Lys Leu Ser Val
865   870   875   880

Pro Leu Glu Val Asp Ile Ser Ile Gly Lys Ser Trp Ser
            885   890